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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

FOREST INSECT CONDITIONS IN
YELLOWSTONE NATIONAL PARK
Season of 1929

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March 20, 1930

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INTRODUCTION

For a period of years it has been the practice of the Bureau of Entomology to submit to the National Park Service, a rather formal report covering the status of insect conditions within the Yellowstone National Park. During the course of the past field season emergency situations arose which required immediate attention so most of the information contained within this report has been previously discussed with officials of the Park and the necessary action taken. However, to complete this information and to make it available for the files of all offices concerned, the practice of submitting this annual report has been continued.

STATUS OF OLD INSECT OUTBREAKS

LODGPOLE NEEDLE TYER (Pezomachus sp.)

LODGPOLE SAWFLY (Neodiprion sp.)

Spraying operations were instituted at West Yellowstone in 1924 to combat an outbreak of the needle tyer and sawfly which had been in existence for some three or four years. Reference is made to past reports submitted by Dr. H. E. Burke and the writer for a discussion of this project as well as a description of the insects and their seasonal histories.

In June 1928 it was determined by the writer that the outbreak of these two insects had died down to such an extent that it would no longer be necessary to continue the spraying operation which had been conducted during the past four years.

During the 1928 season a small amount of damage occurred from the attacks of the needle tyer but the injury to the trees was so slight that it could not be noticed by the casual observer.

In 1929 the same conditions existed with the exception that there was a slight increase in the number of sawfly larvae feeding upon the trees. But the situation was not sufficiently serious to again warrant the institution of spraying. The area will be carefully watched during the coming season in order to prevent if possible the development of another destructive outbreak of these two insects.

SPRUCE BUDWORM (*Cacoecia fumiferana* Clem)

The outbreak of the spruce budworm which occurred along the Yellowstone River in the vicinity of Crescent Hill seems to have completely died down. The evidence of the outbreak can still be seen in the large areas of dead Douglas fir trees throughout this region.

In the southwest corner of the Park the outbreak of this insect in the lodgepole pine stands of that region still continues in an epidemic status. Though within the thousands of acres which are covered by this infestation there has been but very little timber actually destroyed, if the outbreak continues for another year or two in its present severity a heavy loss of timber will undoubtedly occur. During the past season R. E. Balch, an officer of the Coeur d'Alene Station, spent the greater part of the season within this area studying the seasonal history and habits of this insect, with the idea of developing satisfactory methods of artificial control.

Extensive spraying and dusting experiments for the purpose of determining the effectiveness of these methods of control were conducted. The results of these experimental tests were not satisfactory and it is believed that the destruction of these insects in lodgepole pine, through the application of poison sprays or dusts, will prove to be a very difficult task. This difficulty is due to the habit which the budworm larvae have of feeding at the extreme base of the needles, which seems to be very difficult to reach with the poison sprays or dusts. It is possible that as these experiments were conducted during July, and at a time when the larvae were more than half grown, that far better results would have been obtained had these tests been directed against an earlier stage in the development of the insect. It is hoped that tests of this nature can be conducted during the coming season.

In the Cody Canyon the outbreak of the spruce budworm still continues in an epidemic status, and from 1928 to 1929 seemed to increase both in the size of the area infested as well as in the severity of the attack. During June 1929 some experimental spraying was conducted around some of the summer homes, camp sites, dude ranches, etc., for the twofold purpose of determining if this insect could be destroyed by spray while feeding upon Douglas fir, and to test the possibility of using portable forest fire fighting pumps for such work. As a result of this experiment it was very effectively demonstrated that the use of fire pumps for forest tree spraying was entirely unsatisfactory. Sufficient pressure is not developed by these pumps to throw a stream to the tops of the trees,

or to break the stream into the necessary mist which is required for the proper spraying of tall trees. Regardless of this poor equipment it was fairly well demonstrated that if the spray was applied at a time when the buds had fully opened the immature larvae could be destroyed. Present plans call for the institution of an extensive spraying experiment within this region during the coming season. The high-power spraying outfit owned by the National Park Service will be used in this experiment and the trees along the road side for a distance of five or more miles, as well as around the dude ranches, camp sites, et cetera, will be treated, in an effort to preserve as much of the natural beauty of this region as possible.

DOUGLAS FIR BEETLE (Dendroctonus pseudotsugae)

Following the cessation of the spruce budworm epidemic along the Yellowstone River, the weakened and dying Douglas fir trees were attacked by the Douglas fir beetle. For the past few years it has been feared that these insects would, when confronted by a shortage of food material within the defoliated area, spread into the green, uninjured forest adjacent. Though this region has been carefully watched for the past two seasons there is no indication of such an occurrence, other than a normal condition which one would expect to find within an old forest of this character. This situation will be carefully followed for a few years more and in the event of any indication of such an abnormal occurrence, recommendations for control will be promptly made.

The control work directed against an outbreak of this insect at Camp Roosevelt was examined. The work conducted during the previous season was very satisfactorily performed with the exception that three infested trees had been left untreated. At the time of the examination the insect had emerged from these trees and attacked one fairly large individual directly behind the lodge. Undoubtedly there are other trees within the area which have been attacked during the past season, although a rather thorough examination of the trees in the immediate vicinity of the lodge failed to disclose them. All trees infested with the Douglas fir beetle should be felled and burned before May 1, 1930. This matter has been previously brought to the attention of the Park Naturalist.

OREGON ENGRAVER BEETLE (Ips oregoni)

Throughout the Park there are trees to be found which are infested with Ips. For the most part these attacks can not be considered primary as the trees had been injured previously. Some of the most common physical or mechanical injuries are the result of scorching from fires employed in roadside clean-up, the piling of dirt around the base of trees as a result of road grading, excavations for buildings, etc., and the injury to the soil, roots, and base of trees in camp sites, etc. as a result of tourist travel.

FORMATIONS

At Roaring Mountain a patch of lodgepole pine reproduction was again attacked and killed by Ips oregoni during the 1929 season. The source of these insects is not known though they may have developed in some of the fire-injured trees along the road. These trees were felled and piled for burning during the summer but due to the dry season they were not destroyed until late in the season, and it is feared that the insects had no doubt emerged prior to that time. It is believed that these trees could have been safely burned at night.

At the Thumb there were some 25-30 trees varying from small reproduction to mature individuals which had been attacked by Ips. These trees were either on the formations and growing under very unfavorable conditions or else had been severely injured by automobiles, campers, etc. These trees were reported and recommendations made for their prompt treatment.

At the Mud Volcano there were a few trees around the formation infested with Ips. It was also recommended that these trees be treated. A mile to the south of the Mud Volcano there is a rather large group of lodgepole pine trees which have been killed by excessive water. A spring or small stream has overflowed its original channel, flooding the area and causing the death of the trees. As the size of this area is increasing each year, it is recommended that the water be confined to a prescribed course.

CAMP GROUNDS

At the various camp grounds, especially at Old Faithful, there are a number of dead trees to be found each year, and in many cases an examination ^{showed} ~~them~~ to be infested with Ips. However such insect attack is purely secondary to the physical injuries resulting from tourist travel to which the trees have been subjected. A series of photographs is appended to this report in explanation as to why the attack of the insect in relation to the death of these trees is not considered primary. Perhaps the writer is unduly concerned with this annual loss of trees within the camp grounds of the park. It is true that at this time there are but a few trees dying each year, perhaps 1 per cent of the total would cover the annual loss. However, as tourist travel becomes heavier and the injury to the trees more apparent, this loss will increase. In a few years, when one considers the life of the Park, the natural cover of these camp grounds will be seriously depleted, as no provisions are being made to replace these losses through artificial or natural restocking, or to maintain the forests of these areas in a natural condition, so as to insure healthy growing trees.

The writer feels that perhaps the above statement calls for a brief explanation relative to the recommendations which have been made for the treatment of weakened and dying trees infested with Ips oregoni. This insect is for the most part regarded as a secondary enemy of our pine forests. It usually attacks decadent or dying trees, but under certain favorable conditions, which is usually

an abundance of suitable host material, it often develops in such numbers that for a short time it becomes primary and destroys apparently healthy trees. Though the death of a large percent of the trees within the Park, which have been attacked by Ips was assured from injuries previously received, the insects undoubtedly hastened this destruction by a varying number of years. Around the geyser formations this loss of trees is practically unavoidable, as conditions are constantly being developed due to the changing of these formations which makes plant life impossible. Though the development of trees growing under such conditions is arrested and their death assured as a result of the mechanical and physiological injuries they have received, many of them would live for years unless attacked by insects. It has been recommended that such trees, when attacked by insects, be promptly treated for a twofold purpose: (1) by keeping the number of these insects to the lowest minimum possible the life of these weakened trees is prolonged and the aesthetic value of an area maintained, and (2) epidemics of such insects are prevented from developing which might, not only destroy large numbers of the weakened trees in one year, but could possibly spread into the healthy timber stands adjacent. It is rather apparent that during the period this policy has been in practice that satisfactory progress has been made, for in 1929 the general situation relative to camp grounds, showed a decided improvement. Furthermore, from a sanitary viewpoint these trees should be removed, so it is best that they be cared for at a time when the insects infesting them will

be destroyed. It is trusted that this statement will clarify our position relative to the recommendation which has been made for the treatment of Ips infested trees, when the insects are not considered as being primary.

NEW INSECT SITUATIONS

Mammoth Camp Grounds

Early in the season a report had been received at this station to the effect that the limber pine on the camp ground at Mammoth was in a very unhealthy condition. An examination of these trees in June showed that they had been badly injured by aphids. As the new buds were just opening at that time, with the stem mothers in evidence on this new growth, it was recommended that the trees be sprayed with nicotine sulphate (Black Leaf 40). During the summer and as late as September 23 the trees appeared to be in a fairly healthy condition. However, these trees are growing under very unfavorable and abnormal conditions and must be considered as being very susceptible to the attack of insects.

Madison River

The Douglas fir trees along the Madison River at the bridge between West Yellowstone and Madison Junction were badly infested with a spider mite, Bryobia praetiosa Koch. Though the trees were rather badly injured no irrecoverable damage has occurred and no action was taken relative to control.

Though this insect can be controlled rather satisfactorily by certain sprays it is an expensive procedure inasmuch as several applications are necessary each season. Spider mites are always more or less prominent during dry seasons, and it is possible there will not be a recurrence of this pest next year. Other outbreaks were recorded on Douglas fir in Jackson Hole and on spruce along the road between Old Faithful and the Thumb.

Spruce Sawfly

An outbreak of a sawfly belonging to the subfamily Nematinne was recorded on the spruce trees along the road between Old Faithful and the Thumb. Though these insects were very plentiful the trees had not been seriously defoliated; however it is difficult to foresee the future of such outbreaks.

Alpine Fir Infestation

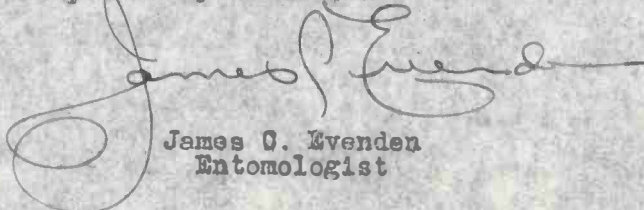
At Duck Lake an examination was made of a group of dying alpine fir. These trees were found to be infested with Dryocetes confusus. Some 50 trees were examined and marked for treatment as a guide for further marking as it was very apparent that there were a great many more which would require treatment. It was recommended that these trees be felled and burned as soon as possible. This recommendation was adopted and some 400 or more trees treated in this manner. The infested trees occurred in rather large groups and it was apparent that this outbreak had developed very rapidly as there had been very

little loss prior to 1929. Though this insect can be found killing alpine fir throughout the Rocky Mountain region, this is the first time that the writer has recorded an outbreak of this character. This area will be carefully examined next season in order to determine the effects of the first control operation which has been directed against this insect, as well as the need for further control.

Mountain Pine Beetle Infestation

An outbreak of the mountain pine beetle in the lodgepole pine stands of the Lamar River region, located in the northeast corner of the Park was discovered and reported upon by officers of the Park Service. Though these officers were of the opinion that this situation was but a normal infestation of the mountain pine beetle and that no control measures were warranted, it is recommended that a thorough examination be made during the coming season. At the present time the timber stands of the Yellowstone National Park are threatened by epidemics of the mountain pine beetle existing in adjacent Montana and Idaho forests. The Forest Service is doing everything in its power, through the institution of artificial control measures, to prevent such an occurrence, and it is essential that every effort be made to prevent the development of similar situations within the region for which protection is desired.

Respectfully submitted



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March 20, 1930



An insect attack of trees of this character would be considered as being secondary to the injuries already received. A surplus of water, exposure and injury to the roots by tramping away the soil, injury to the base of the trees by automobiles, etc., are some of the common injuries which lower the vitality of the trees and make them susceptible to the attacks of secondary insects.